

Remarks/Arguments:

Claims 1-14 are pending. Claims 1-14 stand rejected. Claims 1 and 3-14 are amended, claim 2 is cancelled and claims 15-16 are added. Accordingly, claims 1 and 3-16 are presented for reconsideration.

Foreign Priority

Applicant appreciates the Office's recognition of foreign priority on the original Russian application filed July 11, 2002. Applicant submits herewith a certified copy of the originally filed priority application. Applicant respectfully requests that acknowledgement of this foreign priority document be acknowledged in the next Office Action.

Objection to Title

The title has been objected to as being non-descriptive. Applicant has amended the title and submits that this amended title is descriptive of the claimed invention. Entry of the amended title is respectfully requested.

Objections to Drawings

The Office objected to the drawings with respect to reference characters 2 and 3. Applicant submits herewith a replacement drawing showing the relative positions of elements 2 and 3. These amendments are fully supported by the application as originally filed and do not introduce new matter. Entry of the replacement drawing is respectfully requested.

Objections to the Specification

The Abstract was objected to for a typographical error. Applicant has corrected the typographical error in the amended Abstract submitted herewith. Applicant respectfully requests that the objection to the Abstract be withdrawn.

Claim Informalities

The Office at pages 3-4 objected to claims 1, 2-3, 6-7, 9-10 and 12-13 for containing informalities. Applicant has appropriately amended the claims and respectfully requests, therefore, that the objections to the claims be withdrawn.

Rejections Under 35 U.S.C. § 112

The Office sets forth at page 5 that claim 1 is rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Applicant has appropriately amended claim 1 and respectfully requests, therefore, that the rejection of claim 1 under 35 U.S.C. § 112, second paragraph be withdrawn.

Rejections Under 35 U.S.C. § 102

The Office sets forth at page 6 "Claims 1, 3, 4, 6, 7, 9, 10 and 13 are rejected under 35 U.S.C. 102(a) as being anticipated by Hazelton et al. (US Patent No. 6,437,463)." Applicant respectfully submits that this rejection is overcome by the amendments to the claims for the reasons set forth below.

Applicant's invention as recited in claim 1 includes features not disclosed or suggested by Hazelton, namely:

...the crude positioning stage is executed in the form of a rigid bearing plate carrying a rigidly fixed rectangular frame inside which the fine positioning stage's executing element is situated...

...the latter can move and be fixed in a given position by means of pairs of nanometer range positioning elements, one pair of the nanometer range positioning elements on each one of the four sides of the rigidly fixed rectangular frame...

...the pairs of the nanometer range positioning elements comprising either i) four pairs of magnetostrictive transducers or ii) two pairs of magnetostrictive transducers and two pairs of springs...(Emphasis added)

These features are described in applicant's specification, for example, at page 4, last paragraph and the paragraph bridging pages 8 and 9.

Hazelton is relied upon as "[disclosing] a nanometric positioning device containing a foundation element with attached crude positioning stage capable of backward and forward travel with regard to it...the crude stage is executed in the form of a rigid bearing plate...carrying a rigidly fixed frame inside which the fine stage's executing element is situated...the latter can move and be fixated fixed in a given positioned by mean of pairs of nanometer range positioning elements...on each one of the four sides of the frame..." Applicant respectfully disagrees with this overly broad interpretation of Hazelton and notes that Hazelton fails to disclose or suggest one pair of nanometer range positioning elements on each one of the four sides of the rigidly fixed rectangular frame and that the pairs of nanometer range positioning elements comprise either i) four pairs of magnetostrictive transducers or ii) two pairs of magnetostrictive transducers and two pairs of springs.

According to Hazelton, "Three pairs of electromagnetic actuators may be provided to couple the fine stage to the course stage for control in three degrees of freedom with respect to the coarse stage" (col. 4, lines 30-32) and "The position of the fine stage in three planar degrees of freedom X, Y and Theta Z, is actuated using three pairs of electromagnets 6 that are mounted to the lower stage" (col. 8, lines 26-28). The electromagnets 6 do not contact the target 8 fixed to the fine stage (col. 8, lines 38-66). In accordance with the claimed invention, four pairs of nanometric range positioning elements are used and all nanometric range positioning elements are realized in the form of magnetostrictive transducers or two pairs are realized in the form of magnetostrictive transducers and two pairs are realized in the form of springs.

Usage of magnetostrictive transducers causes ultimate usage of two groups of nanometer range positioning elements. In accordance with applicant's claimed invention, first two opposing pairs of nanometer range positioning elements move the executing element 5 in the X (or Y) direction and to avoid possible skewing, if necessary, turn the executing element 5 in the X-Y plane. Then the other two opposing pairs of nanometer range positioning elements move the executing element in the Y (or X) direction, and to avoid possible skewing, if necessary, turn the executing element 5 in the X-Y plane. Two opposing pairs of nanometer range positioning elements are used in each group to minimize the number of changes of the groups during movement and, of course, finally, to minimize a time of movement of the executing element 5.

Accordingly, because Hazelton fails to disclose each and every feature of claim 1, applicant respectfully submits that the rejection of claim 1 under 35 U.S.C. 102(a) should be withdrawn and the claim allowed.

Claims 3, 4, 6, 7, 9, 10 and 13 depend upon claim 1 and, thus, are likewise not subject to rejection for at least the reasons set forth above with respect to claim 1.

Rejections Under 35 U.S.C. § 103

The Office sets forth at page 8, paragraph 14 "Claims 2, 9, 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hazelton in view of Razzaghi (US Patent No. 5,701,043)." Applicant respectfully disagrees.

The rejection of claim 2 is moot in view of its cancellation.

Razzaghi is relied upon to make up for the deficiencies of Hazelton regarding the use of magnetostrictive transducers. Razzaghi, however, fails to make up for the deficiencies set forth above with respect to Hazelton noted above in regard to claim 1. Accordingly, applicant respectfully submits that claims 9, 10 and 12 are allowable at least based on their dependence on claim 1.

The Office sets forth at page 10, paragraph 15 "Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hazelton et al. in view of Novak et al. (US Patent No. 5,623,853)." Applicant respectfully disagrees.

Novak is relied upon as disclosing "means of fixating the crude positioning stage using the principle of vacuum suction." Novack, however, fails to make up for the deficiencies with respect to Hazelton noted above in regard to claim 1. Accordingly, applicant respectfully submits that claim 5 is allowable at least for the reasons set forth above with respect to claim 1.

The Office sets forth at page 11, paragraph 16 "Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hazelton et al. in view of Suh et al. (US Patent No. 5,579,109)." Applicant respectfully disagrees.

Suh is relied upon as "[disclosing] a heterodyne interferometer capable of measuring length and distance..." Suh, however, fails to make up for the deficiencies with respect to

Hazelton noted above in regard to claim 1. Accordingly, applicant respectfully submits that claim 8 is allowable for at least the reasons set forth above with respect to claim 1.

The Office sets forth at page 11, paragraph 17 "Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hazelton et al. and Razzaghi...and further in view of Novak et al." As set forth above, both Razzaghi and Novak fail to make up for the deficiencies of Hazelton. Accordingly, the combination of Razzaghi and Novak also fail to make up for the deficiencies of Hazelton. Thus, because claim 11 depends upon allowable claim 1, claim 11 is likewise allowable.

The Office sets forth at page 12, paragraph 18 "Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hazelton et al., Razzaghi and Novak et al...and further in view of Suh et al." Applicant respectfully disagrees.

As set forth above, each of Razzaghi, Novak and Suh fail to make up for the deficiencies of Hazelton. Accordingly, the combination of Razzaghi, Novak and Suh also fail to make up for the deficiencies of Hazelton as applied to claim 1 above. Accordingly, because claim 14 depends upon allowable claim 1, claim 14 is likewise allowable.

Claims 15 and 16 are added. These claims do not introduce new matter. Basis for the claims may be found throughout the originally filed application.

Although not identical, claim 15 recites similar features to those of claim 1 and, thus, is likewise allowable over the cited prior art. Claim 16 depends upon claim 15 and is allowable at least for the reasons set forth above with respect to claim 15.

In view of the amendments and remarks set forth above, applicant submits that the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

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Attachments: Figures 1 and 2 (1 sheet)
Abstract

Dated: March 24, 2009

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